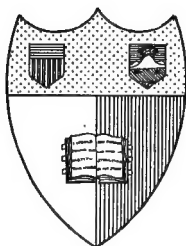


WHITEHEAD — The Rhythm of Education. 1922.

arW

38277



Cornell University Library

Ithaca, New York

BOUGHT WITH THE INCOME OF THE
SAGE ENDOWMENT FUND

THE GIFT OF
HENRY W. SAGE

1891

Cornell University Library

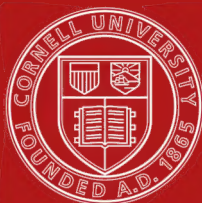
arW38277

The rhythm of education;



3 1924 031 760 287

olin,anx



Cornell University Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

THE RHYTHM OF EDUCATION

THE RHYTHM OF EDUCATION

AN ADDRESS DELIVERED TO THE
TRAINING COLLEGE ASSOCIATION

BY

A. N. WHITEHEAD

F.R.S., Sc.D.

PROFESSOR OF APPLIED MATHEMATICS
IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY



LONDON

CHRISTOPHERS

22 BERNERS STREET, W. 1

7-04.

A546595

First published in 1922

THE RHYTHM OF EDUCATION

BY the Rhythm of Education I denote a certain principle which in its practical application is well known to everyone with educational experience. Accordingly, when I remember that I am speaking to an audience of some of the leading educationists in England, I have no expectation that I shall be saying anything that is new to you. I do think, however, that the principle has not been subjected to an adequate discussion taking account of all the factors which should guide its application.

I first seek for the baldest statement of what I mean by the Rhythm of Education, a statement so bald as to exhibit the point of this address in its utter obviousness. The principle is merely this—that different subjects and modes of study should be undertaken by pupils at fitting times when they have reached the proper stage of mental development. You will agree with me that this is

a truism, never doubted and known to all. I am really anxious to emphasize the obvious character of the foundational idea of my address ; for one reason, because this audience will certainly find it out for itself. But the other reason, the reason why I choose this subject for discourse, is that I do not think that this obvious truth has been handled in educational practice with due attention to the psychology of the pupils.

THE TASKS OF INFANCY

I commence by challenging the adequacy of some principles by which the subjects for study are often classified in order. By this I mean that these principles can only be accepted as correct if they are so explained as to be explained away. Consider first the criterion of difficulty. It is not true that the easier subjects should precede the harder. On the contrary, some of the hardest must come first because nature so dictates, and because they are essential to life. The first intellectual task which confronts an infant is the acquirement of spoken language. What an appalling task, the correlation of meanings with sounds ! It requires an analysis of ideas and an analysis

/

of sounds. We all know that the infant does it, and that the miracle of his achievement is explicable. But so are all miracles, and yet to the wise they remain miracles. All I ask is that with this example staring us in the face we should cease talking nonsense about postponing the harder subjects.

What is the next subject in the education of the infant minds? The acquirement of written language ; that is to say, the correlation of sounds with shapes. Great heavens ! Have our educationists gone mad ? They are setting babbling mites of six years old to tasks which might daunt a sage after lifelong toil. Again, the hardest task in mathematics is the study of the elements of algebra, and yet this stage must precede the comparative simplicity of the differential calculus.

I will not elaborate my point further ; I merely restate it in the form, that the postponement of difficulty is no safe clue for the maze of educational practice.


The alternative principle of order among subjects is that of necessary antecedence. There we are obviously on firmer ground. It is impossible to read *Hamlet* until you can read ; and the study

of integers must precede the study of fractions. And yet even this firm principle dissolves under scrutiny. It is certainly true, but it is only true if you give an artificial limitation to the concept of a subject for study. The danger of the principle is that it is accepted in one sense, for which it is almost a necessary truth, and it is applied in another sense for which it is false. You cannot read Homer before you can read ; but many a child, and in ages past many a man, has sailed with Odysseus over the seas of Romance by the help of the spoken word of a mother, or of some wandering bard. The uncritical application of the principle of the necessary antecedence of some subjects to others has, in the hands of dull people with a turn for organization, produced in education the dryness of the Sahara.



STAGES OF MENTAL GROWTH

The reason for the title which I have chosen for this address, the Rhythm of Education, is derived from yet another criticism of current ideas. The pupil's progress is often conceived as a uniform steady advance undifferentiated by change of type or alteration in pace ; for example,



a boy may be conceived as starting Latin at ten years of age and by a uniform progression steadily developing into a classical scholar at the age of eighteen or twenty. I hold that this conception of education is based upon a false psychology of the process of mental development which has gravely hindered the effectiveness of our methods. Life is essentially periodic. It comprises daily periods, with their alternations of work and play, of activity and of sleep, and seasonal periods, which dictate our terms and our holidays ; and also it is composed of well-marked yearly periods. These are the gross obvious periods which no one can overlook. There are also subtler periods of mental growth, with their cyclic recurrences, yet always different as we pass from cycle to cycle, though the subordinate stages are reproduced in each cycle. That is why I have chosen the term "rhythmic," as meaning essentially the conveyance of difference within a framework of repetition. Lack of attention to the rhythm and character of mental growth is a main source of wooden futility in education. I think that Hegel was right when he analysed progress into three stages, which he called Thesis, Antithesis, and Synthesis ; though for the purpose of the applica-

tion of his idea to educational theory I do not think that the names he gave are very happily suggestive. In relation to intellectual progress I would term them, the stage of romance, the stage of precision, and the stage of generalization.

THE STAGE OF ROMANCE

The stage of romance is the stage of first apprehension. The subject-matter has the vividness of novelty; it holds within itself unexplored connexions with possibilities half-disclosed by glimpses and half-concealed by the wealth of material. In this stage knowledge is not dominated by systematic procedure. Such system as there must be is created piecemeal *ad hoc*. We are in the presence of immediate cognizance of fact, only intermittently subjecting fact to systematic dissection. Romantic emotion is essentially the excitement consequent on the transition from the bare facts to the first realizations of the import of their unexplored relationships. For example, Crusoe was a mere man, the sand was mere sand, the footprint was a mere footprint, and the island a mere island, and Europe was the busy world of men. But the sudden perception of the half-

disclosed and half-hidden possibilities relating Crusoe and the sand and the footprint and the lonely island secluded from Europe constitutes romance. I have had to take an extreme case for illustration in order to make my meaning perfectly plain. But construe it as an allegory representing the first stage in a cycle of progress. Education must essentially be a setting in order of a ferment already stirring in the mind : you cannot educate mind in *vacuo*. In our conception of education we tend to confine it to the second stage of the cycle ; namely, to the stage of precision. But we cannot so limit our task without misconceiving the whole problem. We are concerned alike with the ferment, with the acquirement of precision, and with the subsequent fruition.

THE STAGE OF PRECISION

The stage of precision also represents an addition to knowledge. In this stage, width of relationship is subordinated to exactness of formulation. It is the stage of grammar, the grammar of language and the grammar of science. It proceeds by forcing on the students' acceptance a given way of analysing the facts, bit by bit. New facts are

added, but they are the facts which fit into the analysis.

It is evident that a stage of precision is barren without a previous stage of romance: unless there are facts which have already been vaguely apprehended in their broad generality, the previous analysis is an analysis of nothing. It is simply a series of meaningless statements about bare facts, produced artificially and without any further relevance. I repeat that in this stage we do not merely remain within the circle of the facts elicited in the romantic epoch. The facts of romance have disclosed ideas with possibilities of wide significance, and in the stage of precise progress we acquire other facts in a systematic order, which thereby form both a disclosure and an analysis of the general subject-matter of the romance.

THE STAGE OF GENERALIZATION

The final stage of generalization is Hegel's synthesis. It is a return to romanticism with added advantage of classified ideas and relevant technique. It is the fruition which has been the goal of the precise training. It is the final success. I am afraid that I have had to give a dry analysis of some-

what obvious ideas. It has been necessary to do so because my subsequent remarks presuppose that we have clearly in our minds the essential character of this threefold cycle.

THE CYCLIC PROCESSES

Education should consist in a continual repetition of such cycles. Each lesson in its minor way should form an eddy cycle issuing in its own subordinate process. Longer periods should issue in definite attainments, which then form the starting-grounds for fresh cycles. We should banish the idea of a mythical, far-off end of education. The pupils must be continually enjoying some fruition and starting afresh—if the teacher is stimulating in exact proportion to his success in satisfying the rhythmic cravings of his pupils.

An infant's first romance is its awakening to the apprehension of objects and to the appreciation of their connexions. Its growth in mentality takes the exterior form of occupying itself in the co-ordination of its perceptions with its bodily activities. Its first stage of precision is mastering spoken language as an instrument for classifying its contemplation of objects and for strengthening

its apprehension of emotional relations with other beings. Its first stage of generalization is the use of language for a classified and enlarged enjoyment of objects.

This first cycle of intellectual progress from the achievement of perception to the acquirement of language, and from the acquirement of language to classified thought and keener perception, will bear more careful study. It is the only cycle of progress which we can observe in its purely natural state. The later cycles are necessarily tinged by the procedure of the current mode of education. There is a characteristic of it which is often sadly lacking in subsequent education; I mean, that it achieves complete success. At the end of it the child *can* speak, its ideas *are* classified, and its perceptions *are* sharpened. The cycle achieves its object. This is a great deal more than can be said for most systems of education as applied to most pupils. But why should this be so? Certainly, a newborn baby looks a most unpromising subject for intellectual progress when we remember the difficulty of the task before it. I suppose it is because nature, in the form of surrounding circumstances, sets it a task for which the normal

development of its brain is exactly fitted. I do not think that there is any particular mystery about the fact of a child learning to speak and in consequence thinking all the better ; but it does offer food for reflection.

In the subsequent education we have not sought for cyclic processes which in a finite time run their course and within their own limited sphere achieve a complete success. This completion is one outstanding character in the natural cycle for infants. Later on we start a child on some subject, say Latin, at the age of ten, and hope by a uniform system of formal training to achieve success at the age of twenty. The natural result is failure, both in interest and in acquirement. When I speak of failure, I am comparing our results with the brilliant success of the first natural cycle. I do not think that it is because our tasks are intrinsically too hard, when I remember that the infant's cycle is the hardest of all. It is because our tasks are set in an unnatural way, without rhythm and without the stimulus of intermediate successes and without concentration.

I have not yet spoken of this character of concentration which so conspicuously attaches to the infant's progress. The whole being of the

infant is absorbed in the practice of its cycle. It has nothing else to divert its mental development. In this respect there is a striking difference between this natural cycle and the subsequent history of the student's development. It is perfectly obvious that life is very various and that the mind and brain naturally develop so as to adapt themselves to the many-hued world in which their lot is cast. Still, after making allowance for this consideration, we will be wise to preserve some measure of concentration for each of the subsequent cycles. In particular, we should avoid a competition of diverse subjects in the same stage of their cycles. The fault of the older education was unrhythmic concentration on a single undifferentiated subject. Our modern system, with its insistence on a preliminary general education, and with its easy toleration of the analysis of knowledge into distinct subjects, is an equally unrhythmic collection of distracting scraps. I am pleading that we shall endeavour to weave in the learner's mind a harmony of patterns, by co-ordinating the various elements of instruction into subordinate cycles each of intrinsic worth for the immediate apprehension of the pupil. We must garner our crops each in its due season,

THE ROMANCE OF ADOLESCENCE

We will now pass to some concrete applications of the ideas which have been developed in the former part of my address.

The first cycle of infancy is succeeded by the cycle of adolescence, which opens with by far the greatest stage of romance which we ever experience. It is in this stage that the lines of character are graven. How the child emerges from the romantic stage of adolescence is how the subsequent life will be moulded by ideals and coloured by imagination. It rapidly follows on the generalization of capacity produced by the acquirements of spoken language and of reading. The stage of generalization belonging to the infantile cycle is comparatively short because the romantic material of infancy is so scanty. The initial knowledge of the world in any developed sense of the word "knowledge" really commences after the achievement of the first cycle, and thus issues in the tremendous age of romance. Ideas, facts, relationships, stories, histories, possibilities, artistry in words, in sounds, in form and in colour, crowd into the child's life, stir his feelings,

excite his appreciation, and incite his impulses to kindred activities. It is a saddening thought that on this golden age there falls so often the shadow of the crammer. I am thinking of a period of about four years of the child's life, roughly, in ordinary cases, falling between the ages of eight and twelve or thirteen. It is the first great period of the utilization of the native language, and of developed powers of observation and of manipulation. The infant cannot manipulate, the child can ; the infant cannot observe, the child can ; the infant cannot retain thoughts by the recollection of words, the child can. The child thus enters upon a new world.

Of course, the stage of precision prolongs itself as recurring in minor cycles which form eddies in the great romance. The perfecting of writing, of spelling, of the elements of arithmetic, and of lists of simple facts, such as the Kings of England, are all elements of precision, very necessary both as training in concentration and as useful acquirements. However, these are essentially fragmentary in character, whereas the great romance is the flood which bears on the child towards the life of the spirit.

The success of the Montessori system is due to

its recognition of the dominance of romance at this period of growth. If this be the explanation, it also points to the limitations in the usefulness of that method. It is the system which in some measure is essential for every romantic stage. Its essence is browsing and the encouragement of vivid freshness. But it lacks the restraint which is necessary for the great stages of precision.

THE MASTERY OF LANGUAGE

Towards the end of the great romance the cyclic course of growth is swinging the child ever towards an aptitude for exact knowledge. Language is now the natural subject-matter for concentrated attack. It is the mode of expression with which he is thoroughly familiar. He is acquainted with stories, histories, and poems illustrating the lives of other people and of other civilizations. Accordingly, from the age of eleven onwards there is wanted a gradually increasing concentration towards precise knowledge of language. Finally, the three years from twelve to fifteen should be dominated by a mass attack upon language, so planned that a definite result, in itself worth having, is thereby achieved. I should guess that

within these limits of time, and given adequate concentration, we might ask that at the end of that period the children should have command of English, should be able to read fluently fairly simple French, and should have completed the elementary stage of Latin ; I mean, a precise knowledge of the more straightforward parts of Latin grammar, the knowledge of the construction of Latin sentences, and the reading of some parts of appropriate Latin authors, perhaps simplified and largely supplemented by the aid of the best literary translations so that their reading of the original, plus translation, gives them a grip of the book as a literary whole. I conceive that such a measure of attainment in these three languages is well within the reach of the ordinary child, provided that he has not been distracted by the effort at precision in a multiplicity of other subjects. Also some more gifted children could go further. The Latin would come to them easily, so that it would be possible to start Greek before the end of the period, always provided that their bent is literary and that they mean later to pursue that study at least for some years. Other subjects will occupy a subordinate place in the time-table and will be undertaken in a different

spirit. In the first place, it must be remembered that the semi-literary subjects, such as history, will largely have been provided in the study of the languages. It will be hardly possible to read some English, French, and Latin literature without imparting some knowledge of European history. I do not mean that all special history teaching should be abandoned. I do, however, suggest that the subject should be exhibited in what I have termed the romantic spirit, and that the pupils should not be subjected to the test of precise recollection of details on any large systematic scale.

At this period of growth science should be in its stage of romance. The pupils should see for themselves, and experiment for themselves, with only fragmentary precision of thought. The essence of the importance of science, both for interest in theory or for technological purposes, lies in its application to concrete detail, and every such application evokes a novel problem for research. Accordingly, all training in science should begin as well as end in research, and in getting hold of the subject-matter as it occurs in nature. The exact form of guidance suitable to this age and the exact limitations of experiment

are matters depending on experience. But I plead that this period is the true age for the romance of science.

CONCENTRATION ON SCIENCE

Towards the age of fifteen the age of precision in language and of romance in science draws to its close, to be succeeded by a period of generalization in language and of precision in science. This should be a short period, but one of vital importance. I am thinking of about one year's work, and I suggest that it would be well decisively to alter the balance of the preceding curriculum. There should be a concentration on science and a decided diminution of the linguistic work. A year's work on science, coming on the top of the previous romantic study, should make everyone understand the main principles which govern the development of mechanics, physics, chemistry, algebra and geometry. Understand that they are not beginning these subjects, but they are putting together a previous discursive study by an exact formulation of their main ideas. For example, take algebra and geometry, which I single out as being subjects with which I have some

slight familiarity. In the previous three years there has been work on the applications of the simplest algebraic formulæ and geometrical propositions to problems of surveying, or of some other scientific work involving calculations. In this way arithmetic has been carefully strengthened by the insistence on definite numerical results, and familiarity with the ideas of literal formulæ and of geometrical properties has been gained; also some minor methods of manipulation have been inculcated. There is thus no long time to be wasted in getting used to the ideas of the sciences. The pupils are ready for the small body of algebraic and geometrical truths which they ought to know thoroughly. Furthermore, in the previous period some boys will have shown an aptitude for mathematics and will have pushed on a little more, besides in the final year somewhat emphasizing their mathematics at the expense of some of the other subjects. I am simply taking mathematics as an illustration.

Meanwhile, the cycle of language is in its stage of generalization. In this stage the precise study of grammar and composition is discontinued, and the language study is confined to reading the literature with emphasized attention to its ideas

and to the general history in which it is embedded ; also the time allotted to history will pass into the precise study of a short definite period, chosen to illustrate exactly what does happen at an important epoch and also to show how to pass the simpler types of judgments on men and policies.

I have now sketched in outline the course of education from babyhood to about sixteen and a half, arranged with some attention to the rhythmic pulses of life. In some such way a general education is possible in which the pupil throughout has the advantage of concentration and of freshness. Thus precision will always illustrate subject-matter already apprehended and crying out for drastic treatment. Every pupil will have concentrated in turn on a variety of different subjects, and will know where his strong points lie. Finally—and this of all the objects to be attained is the most dear to my heart—the science students will have obtained both an invaluable literary education and also at the most impressionable age an early initiation into habits of thinking for themselves in the region of science.

After the age of sixteen new problems arise. For literary students science passes into the stage

of generalization, largely in the form of lectures on its main results and general ideas. New cycles of linguistic, literary, and historical study commence. But further detail is now unnecessary. For the scientists the preceding stage of precision maintains itself to the close of the school period with an increasing apprehension of wider general ideas.

However, at this period of education the problem is too individual, or at least breaks up into too many cases, to be susceptible of broad general treatment. I do suggest, nevertheless, that all scientists should now keep up their French, and initiate the study of German if they have not already acquired it.

UNIVERSITY EDUCATION

I should now like, if you will bear with me, to make some remarks respecting the import of these ideas for a University education.

The whole period of growth from infancy to manhood forms one grand cycle. Its stage of romance stretches across the first dozen years of life, its stage of precision comprises the whole school period of secondary education, and its

stage of generalization is the period of entrance into manhood. For those whose formal education is prolonged beyond the school age, the University course or its equivalent is the great period of generalization. The spirit of generalization should dominate a University. The lectures should be addressed to those to whom details and procedure are familiar ; that is to say, familiar at least in the sense of being so congruous to pre-existing training as to be easily acquirable. During the school period the student has been mentally bending over his desk ; at the University he should stand up and look around. For this reason it is fatal if the first year at the University be frittered away in going over the old work in the old spirit. At school the boy painfully rises from the particular towards glimpses at general ideas ; at the University he should start from general ideas and study their applications to concrete cases. A well-planned University course is a study of the wide sweep of generality. I do not mean that it should be abstract in the sense of divorce from concrete fact, but that concrete fact should be studied as illustrating the scope of general ideas.

CULTIVATION OF MENTAL POWER

This is the aspect of University training in which theoretical interest and practical utility coincide. Whatever be the detail with which you cram your student, the chance of his meeting in after-life exactly that detail is almost infinitesimal ; and if he does meet it, he will probably have forgotten what you taught him about it. The really useful training yields a comprehension of a few general principles with a thorough grounding in the way they apply to a variety of concrete details. In subsequent practice the men will have forgotten your particular details ; but they will remember by an unconscious common sense how to apply principles to immediate circumstances. Your learning is useless to you till you have lost your text-books, burnt your lecture notes, and forgotten the minutiae which you learnt by heart for the examination. What, in the way of detail, you continually require will stick in your memory as obvious facts like the sun and moon ; and what you casually require can be looked up in any work of reference. The function of a University is to enable you to shed details in favour of prin-

ciples. When I speak of principles I am hardly even thinking of verbal formulations. A principle which has thoroughly soaked into you, is rather a mental habit than a formal statement. It becomes the way the mind reacts to the appropriate stimulus in the form of illustrative circumstances. Nobody goes about with his knowledge clearly and consciously before him. Mental cultivation is nothing else than the satisfactory way in which the mind will function when it is poked up into activity. Learning is often spoken of as if we are watching the open pages of all the books which we have ever read, and then, when occasion arises, we select the right page to read aloud to the universe.

Luckily, the truth is far otherwise from this crude idea; and for this reason the antagonism between the claims of pure knowledge and professional acquirement should be much less acute than a faulty view of education would lead us to anticipate. I can put my point otherwise by saying that the ideal of a University is not so much knowledge, as power. Its business is to convert the knowledge of a boy into the power of a man.

THE RHYTHMIC CHARACTER OF GROWTH

I will conclude with two remarks which I wish to make by way of caution in the interpretation of my meaning. The point of this address is the rhythmic character of growth. The interior spiritual life of man is a web of many strands. They do not all grow together by uniform extension. I have tried to illustrate this truth by considering the normal unfolding of the capacities of a child in somewhat favourable circumstances but otherwise with fair average capacities. Perhaps I have misconstrued the usual phenomena. It is very likely that I have so failed, for the evidence is complex and difficult. But do not let any failure in this respect prejudice the main point which I am here to enforce. It is that the development of mentality exhibits itself as a rhythm involving an interweaving of cycles, the whole process being dominated by a greater cycle of the same general character as its minor eddies. Furthermore, this rhythm exhibits certain ascertainable general laws which are valid for most pupils, and the quality of our teaching should be so adapted as to suit the stage in the

rhythm to which our pupils have advanced. The problem of a curriculum is not so much the succession of subjects ; for all subjects should in essence be begun with the dawn of mentality. The truly important order is the order of quality which the educational procedure should assume.

My second caution is to ask you not to exaggerate into sharpness the distinction between the three stages of a cycle. I strongly suspect that many of you, when you heard me detail the three stages in each cycle, said to yourselves—How like a mathematician to make such formal divisions ! I assure you that it is not mathematics but literary incompetence that may have led me into the error against which I am warning you. Of course, I mean throughout a distinction of emphasis, of pervasive quality—romance, precision, generalization, are all present throughout. But there is an alternation of dominance, and it is this alternation which constitutes the cycles.

